OUR SINKING SHIP

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Over the past century, we have become our own worst enemy, by letting water seep in unnoticed into our ship. Our ship is what we call Canada, and the water seeping in are the invasive species, which is defined as "an organism (plant, animal, fungus, or bacterium) that is not native [to the area] and has negative effects on [the] economy, [the] environment, or [the area's] health".[3] In the past, ships were saved by closing their holes and removing any water that seeped inside. This provided a permanent solution which prevented endless removal of water that seeped inside the ships. This analogy can be applied to invasive species in Canada.

We need to stop existing invasive species from entering, (plug the present holes) and prevent new invasive species from entering, (prevent new holes from occurring) in our ship before we start finding a solution for the species present in our home (the water that has already seeped in). To understand how to repair the ship holes, we need to first identify the invasive species in Canada, the damage they are causing, their reproduction, and how we can eliminate future invasions. With such a large ship, the hull must be viewed in parts, where one areas of great concern is the Great Lake regions.

Nous sommes à bord d'un navire qui coule! Au fil de notre siècle, nous sommes devenus nos pires ennemis en permettant l'eau de rentrer inaperçue. Notre navire est ce que nous appelons notre maison, notre pays, et l'eau qui rentre sont les espèces invasives. Dans le passé, les bateaux étaient sauvés et bouchant les trous et en enlevant l'eau. Le bouchon assurait qu'une solution permanente était en place au lieu d'enlever l'eau inutilement, car elle rentrait en permanence dans les trous. La même analogie peut être appliquée à des espèces invasives. Nous devons empêcher des espèces invasives d'entrer dans notre pays (boucher les trous) et éviter que des nouvelles entrent (prévenir que d'autres trous se forment) dans notre navire avant de trouver une solution pour l'espèce qui rentre dans notre maison (l'eau qui est déjà rentrée). Afin de comprendre comment réparer les trous, nous devons comprendre ce que sont des espèces invasives, les dommages qu'elles causent, comment elles entrent et comment elles se propagent, et comment nous pouvons prévenir leur entrée. Avec un tel navire, nous devons regarder les parties du bateau séparément. Une des régions inquiétantes est la région des Grands Lacs.

THE GREAT LAKES

The Great Lakes are home to over 3500 different species and over 452 of these species are non-native; However, not all non-native species that are are considered invasive.[1]

Invasive species present in the Great Lakes are out competing the native species for food and shelter, causing a decreasing number of the native species population. Some examples of invasive species present in the Great Lakes include zebra mussels, sea lamprey, rusty crayfish, spiny water flea, white perch, and purple lustrife. If we continue to let invasive species population increase by reproduction and/or allowing more to enter Canada, they will continue to expand in population, negatively affecting more ecosystems and native species.

Unlike native species that have predators to keep the population in check, invasive species do not have native enemies, so there is nothing keeping their numbers in reasonable sizes! As a result, a larger invasive species population can out compete existing native plants and animals for resources. Some invasive species that are left alone caused the extinction of native species or are seriously threatening their population. For example, the native plant cattail is becoming endangered because the invasive purple lustrife is eliminating the species' food supplies and invading its natural habitat.

Not only do we need to deal with the species present in out ecosystems, we need to stop new species from entering our ecosystems. It has been predicted that within the next couple of years, new invasive species, such as the killer shrimp and the monkey goby, will invade the Great Lakes due to increasing number of boats travelling and the importing invasive species for home decor in the region. If actions to aren't taken to prevent this phenomenon, more invasive species will pose a threat to the Great Lakes region.

NATURAL BORDERS

Species are also gaining entry to Canada via mud from foreign regions adhering to motor vehicles, releasing of non-native, domestic pets into the wild, unregulated releasing of foreign ballast water from ships into Canadian waters, transportation of animal feces (that contain the eggs/seeds of invasive species), movement of contaminated wood/soil to new areas, and species' migration through man-made water ways. For example, Niagara Falls originally kept species-such as the sea lamprey and the white perch-out of the Upper Lake water bodies. When Canadians needed boats to travel from the ocean to the lakes, man-made water canals were created as a result of this need. However, these water canals also provided a passage for sea lamprey and white perch to enter the Upper Lakes. Currently, numerous foreign cargo ships release ballast waters into the Great Lakes, transporting millions of aquatic species into Canada every year.

EFFECTS OF INVASIVE SPECIES

Invasive species affect the food chains of local species, invading habitats and entering the nitrogen and the energy cycle. Invasive species may compete with the ecosystems' native species for food, habitat, and other resources. This may limit the resources available for native species, potentially causing a population decline, leading to eventual loss of biodiversity, as the invasive species takes over the native ones. Invasive species also may change the energy and the nitrogen cycles (Union of Concerned Scientists 2007) . They effect the energy cycle by the amount of food eaten by each animal and how much energy is present in that ten present when past when the amount of food of specific species is minimizing due to invasive species. Certain plants are able to effect the nitrogen cycle by changing the acidity of the native soil, making it inhospitable for other plants to thrive in the area.

ECONOMY & HEALTH

In addition to negatively impacting the Great Lakes' environments, invasive species also cause problems for Canada's economy and health. Invasive species affect the local species by entering their food chain, taking over the habitat and entering mandatory cycles. Invasive species eat native animals and plants that causes minimize, reducing their numbers due to being overeaten by the new species and natural species. This many minimized amount of food for native animals as well as it could cause a large drop in the population with other factors like being over hunted, under fed, their habitat is getting destroyed or their young are getting eaten. This causes a loss of biodiversity as the native species are being minimized or extinguished while the invasive species takes over. The economy can be affected by species like zebra mussels, which adhere everything in sight, clogging up city water ways and pipes. This causes a large part of the city's budget to be spent clearing out the pipe line as well as dealing with ways to keep the zebra mussels out of the pipe line. In Ontario, an estimated 75-91 million dollars was spent on the impact of zebra mussels.

Our health is affected when we consume the pesticides in our food that was used for warding off invasive species. Furthermore, the pesticides can contaminate our water, plants, and animals. Invasive species also bring in new diseases that can severely impact human health . In the past 20 years, we have started to acknowledge and deal with the invasive species that have entered our environment. To minimize the spread of invasive species the government and many small organizations have put in a great deal of money to get rid of and stop the spread of many different invasive species. In airports-dried flowers, herbs and food imports have specific selections for entering Canada, to minimize and prevent the introduction of diseases into our ecosystems. The ballast water law regulates prevents ballast water from ships from being dumped or refilled in Canadian waters, including the Great Lakes, to prevent the introduction of new aquatic invasive species and/or increase the number of any existing invasive species.[9]

THE FUTURE OF INVASIVE SPECIES

We are on the right track towards protecting our ship and making sure no more water enters, but we still have a lot to do to stop the inflow. To minimize the spread of invasive plants and aquatic animals from gardens and ponds, the suppliers such as stores should no longer be able to legally sell the invasive species in Canada. This will prevent the spread of seeds outside the garden.

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Canadians need to be educated on what plants should be avoided or not planted or removed from their gardens to stop the spread of the species. Another suggestion is to regulate that all boats must be cleaned before entering new bodies of water and/or crossing boarders to prevent aquatic hitch hikers to be transported from one body of water to the next.

If the public is informed about the changes in our environment due to these species and they understand the resulting changes in the laws to prevent invasive specie arrival and spread, the public may be more inclined to fix our hull with us. If they understand how to dispose of unwanted pets like turtles, fish and lizards for example and are made aware of the penalties for dumping of pets or incentive programs for donating unwanted pets to zoos we will be able to decrease the amount of animals released and the spread of wood. It is time to stop the inflow of invasive species into Canada instead of just bailing the water. By understanding what an invasive species is, where the species come from, their affect on/how they damage our environment and how we are able to minimize their infection/stop their spread, we can fix our hull.

By understanding how the invasive species enter our Great Lakes, we are able to understand how to minimize their entry and stop them spreading from one Lake to the next. Every citizen has a part to play and must if we are to protect our ship. We need your help if we are to keep our ship from sinking. Every effort helps.

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GROWING UP, SCIENCE (ESPECIALLY BIOLOGY) ALWAYS INTERESTED ME

By Sarina Lalla

MY SCIENCE STORY REALLY TOOK OFF WHEN I WAS 14 YEARS OLD.

That was the year I actually had biology as a subject for the first time, and I was in awe. The effectiveness of the human body and the fact that it functioned almost like a machine fascinated me. However, more